BONNEVILLE POWER ADMINISTRATION

Habitat Evaluation Procedures (HEP) Report

Hellsgate Project

Technical Report 1999 - 2000 May 2000 DOE/BP-63210-2

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HABITAT EVALUATION PROCEDURE REPORT FOR NEW ACQUISITIONS

HELLSGATE PROJECT REPORT

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ABSTRACT

A Habitat Evaluation Procedure (HEP) study was conducted on lands acquired and/or managed (4,568 acres total) by the Hellsgate Big Game Winter Range Wildlife Mitigation Project (Hellsgate project) to mitigate some of the losses associated with the original construction and operation of Grand Coulee Dam and inundation of habitats behind the dams. Three separate properties, totaling 2,224 acres were purchased in 1998. One property composed of two separate parcels, mostly grassland lies southeast of the town of Nespelem in Okanogan County (770 acres) and was formerly called the Hinman property. The former Hinman property lies within an area the Tribes have set aside for the protection and preservation of the sharp-tailed grouse (Agency Butte unit). This special management area minus the Hinman acquisition contains 2,388 acres in a long-term lease with the Tribes. The second property lies just south of the Silver Creek turnoff (Ferry County) and is bisected by the Hellsgate Road (part of the Friedlander unit). This parcel contains 60 acres of riparian and conifer forest cover. The third property (now named the Sand Hills unit) acquired for mitigation (1,394 acres) lies within the Hellsgate Reserve in Ferry County. This new acquisition links two existing mitigation parcels (the old Sand Hills parcels and the Lundstrum Flat parcel, all former Kuehne purchases) together forming one large unit.

HEP team members included individuals from the Colville Confederated Tribes Fish and Wildlife Department (CTCR), Washington Department of Fish and Wildlife (WDFW), and Bureau of Land Management (BLM). The HEP team conducted a baseline habitat survey using the following HEP species models: mule deer (*Odocoileus hemionus*), mink (*Mustela vison*), downy woodpecker (*Picoides pubescens*), bobcat (*Lynx rufus*), yellow warbler (*Dendroica petechia*), and sharp-tailed grouse (*Tympanuchus phasianellus columbianus*).

HEP analysis and results are discussed within the body of the text.
The cover types evaluated for this study were grasslands, shrub-steppe, rock, conifer forest and woodland, and riparian. These same cover types were evaluated for other Hellsgate Project acquisitions within the same geographic area. Mule deer habitat on the Sand Hills unit rated good overall for winter food and cover in the shrub-steppe and conifer woodland cover types. Sharp-tailed grouse habitat on the former Hinman property and special management area rated good for nesting and brood rearing in the grassland cover type. Mink habitat on the Friedlander parcel rated poor due to lack of food and cover in and along the riparian cover type. The Downy woodpecker rated poor for food and cover on the Friedlander parcel in the conifer forest cover type. This species also rated poor on the conifer woodland habitat on the Hinman parcel. Yellow warbler habitat on the Agency Butte Special Management area rated very poor due to lack of shrubs for cover and reproduction around the scattered semi/permanent ponds that occur on the area. Bobcat habitat on this same area rated poor due to lack of cover and food. Fragmentation of existing quality habitat is also a problem for both these species.

This report is an analysis of baseline habitat conditions on mitigation and managed lands, and provides estimated habitat units for mitigation crediting purposes. In addition, this information will be used to manage these lands for the benefit of wildlife.

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ACKNOWLEDGEMENTS

I would like to thank Steve judd, co-author and project coordinator for his dedication to this study; professional input and guidence that made it possible to secure and manage these lands with BPA funding for the benefit of wildlife.

We would like to thank Joe DeHerrera, (BPA Division of Fish& Wildlife) who served as BPA Project Manager.

We would like to thank the Washington Department of Wildlife (WDFW) especially Paul Ashley for mutual assistance, cooperation and the HEP models associated with the study.

We would like to thank the Bureau of Land Management (BLM) especially Todd Thompson for assistance and cooperation with the field portion of this study.

We would like to express our thanks to our colleagues for assistance, support and advice in preparing this study. Especially Sheryl Sears for her assistance with computer generated maps for this report.

INTRODUCTION

The development of the hydropower system on the Columbia River Basin has affected many species of wildlife as well as fish. Some floodplain and riparian habitats important to wildlife were inundated when the reservoirs were filled. In some cases, fluctuating water levels caused by dam operations have created barren vegetation zones, which expose wildlife to increased predation. In addition to these reservoir-related effects, a number of other activities associated with hydroelectric development have altered land and stream in ways that further impact wildlife. These activities include construction of roads and facilities, draining and filling wetlands, stream channelization and shoreline riprap. In some cases, the construction and maintenance of power transmission corridors altered vegetation, increased access to and harassment of wildlife, and increased erosion and sedimentation in the Columbia River and its tributaries.

In 1980, Congress passed the Pacific Northwest Power Planning Conservation Act (Northwest Power Act). The Act requires the Bonneville Power Administration (BPA) to protect, mitigate, and enhance wildlife to the extent it was affected by the development and operation of hydropower projects on the Columbia River and its tributaries. This legislation also created the Northwest Power Planning Council (NPPC). Until this Act, there was little hope that wildlife restoration would take place to address losses associated with some of the federal hydroelectric dams in the state.

Through the 1980's, the NPPC worked with federal and state agencies and Indian Tribes to develop reservoir mitigation plans. The NPPC considered wildlife loss estimates, methods of restoration, private versus public land use, leasing versus willing seller acquisition, impacts to local communities, the role of local government in the planning process, and other concerns.

In 1989, the NPPC amended the Columbia Basin Fish and Wildlife Program and created the Wildlife Rule. The resultant Wildlife Rule included a series of criteria to be used to ensure that public and Tribal concerns are addressed in each mitigation project made by wildlife management agencies (the 1989 Wildlife Rule was revised in 1994).

The Hellsgate Big Game Winter Range Wildlife Mitigation Project (Hellsgate Project) was approved as a wildlife mitigation project to address adverse impacts caused by the construction and operation of Grand Coulee and Chief Joseph hydroelectric dams. This Hellsgate Project is funded by the BPA and carried out in cooperation with other federal and state agencies.

The Hellsgate Project began mitigating for losses to wildlife in 1992 with the first land purchase using BPA funds. To calculate losses/gains for mitigation the Habitat Evaluation Procedure or HEP was used to document the non-monetary value of fish and wildlife resources. HEP, developed by USFWS, is based on ecological principals and the assumption that habitat for selected wildlife species can be described as a numerical value known as a Habitat Suitability Index (HSI). This value is derived from an evaluation of the ability of key habitat components to supply the life requisites of selected species of fish and wildlife. Evaluation and monitoring involves using the same key components to compare existing habitat conditions with optimum habitat conditions for selected species and over time measure/compare habitat losses and gains.

HEP studies are carried out on each new acquisition to develop both baseline and long-term monitoring data. HEP results are reported to BPA for crediting and/or publication.

The goals of this project are as follows: To mitigate for the losses that occurred to wildlife as a result of hydropower development. To protect, restore and enhance those habitats and species currently managed on the Hellsgate Project lands. The Hellsgate Project is designed to be very long-term, 99 plus years.

The Hellsgate Project (as of January 2001) contains a total of 18,876 acres that have been acquired for mitigation (see Reservation map with mitigation lands below) and 2,388 acres that have been set aside by the Tribes as a special management area for wildlife specifically the Sharp-tailed grouse. Table 1 next page, describes the amount and habitat type of mitigation lands to date.

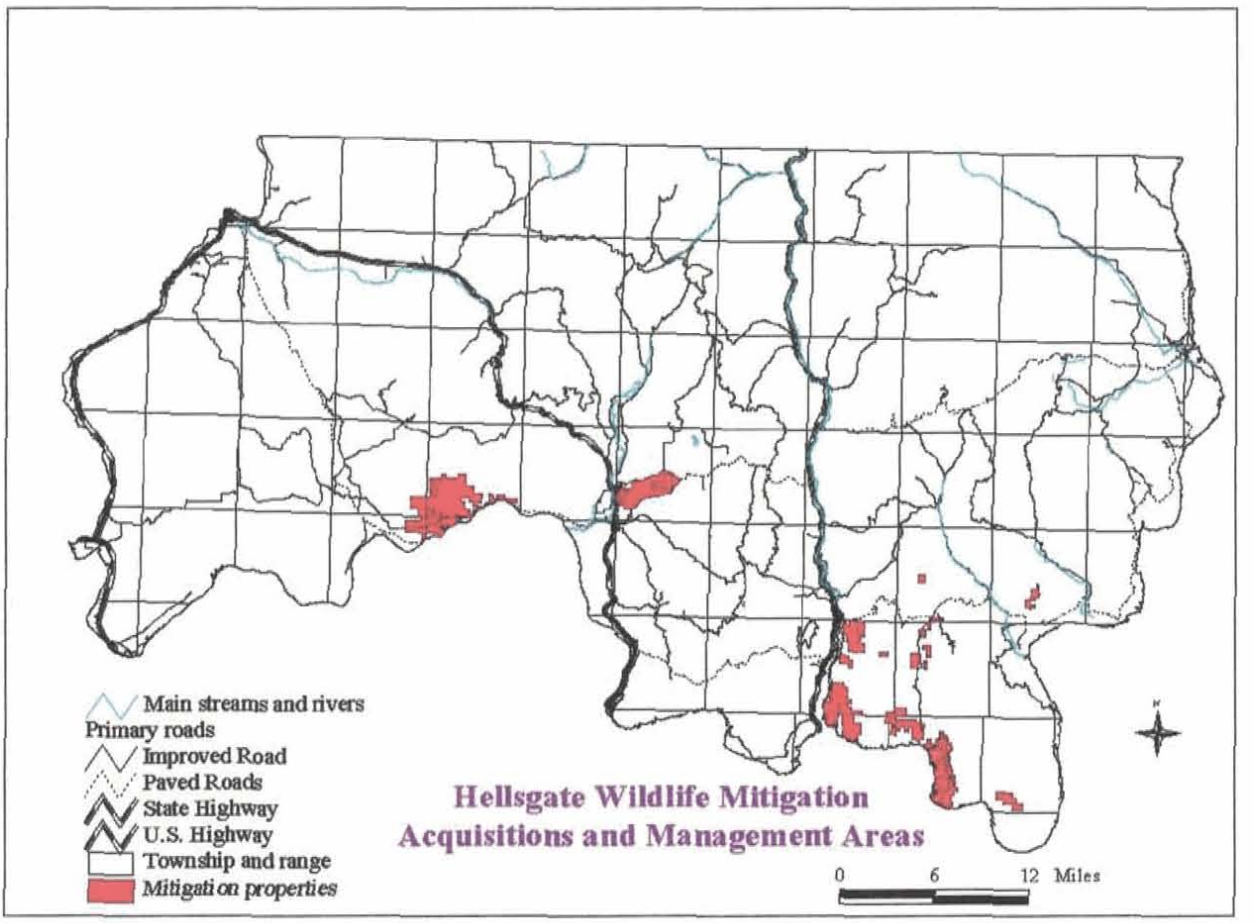


Figure 1. Reservation Map with Hellsgate Wildlife Mitigation Acquisitions and Management Areas.

Table 1. Hellsgate Project Acreages by Unit and by Cover types within Units.

PROPERTY	ACRES	S-STEPPE	AGLAND	GRASS	CON-FOR	CON-WOOD	FOR WET	RIVERINE	SHRUB WET	SHORE	ROCK
W. Kuehne											
Ranch Unit	1,441	1252	130	0	0	30	0	29	0	0	0
Williams Flat	950	250	210	0	120	320	0	16	0	0	34
Sand Hills	460	275	0	0	0	160	0	25	0	0	0
Lundstrum	405	155	233	0	0	0	0	2	0	14	1
Simons Unit	615	78	260	0	174	84	0	19	0	0	0
Baulne Unit	140	0	80	0	60	0	0	0	0	0	0
Sclome Unit	120	0	0	0	112	0	0	8	0	0	0
Bridge Creek	63	0	25	0	0	0	8	30	0	0	0
Friedlander	620	0	16	0	586	0	0	18	0	0	0
SUBTOTALS	**4,814**	2,010	954	0	1,052	594	8	147	0	14	35
H. Kuehne											
Silver Creek	1,583	40	260	0	1185	87	0	11	0	0	0
Ranch Unit	1374	1200	47	0	0	63	50	10	0	4	0
Williams Flat	570	20	240	0	180	50	70	10	0	0	0
Lundstrum	464	22	200	0	0	150	80	8	0	4	0
Sand Hills	369	107	0	0	0	241	0	3	0	18	0
Baulne Unit	226	0	80	0	131	0	0	15	0	0	0
Friedlander	140	0	32	0	100	0	0	8	0	0	0
Bridge Creek	74	15	0	0	8	0	0	8	43	0	0
SUBTOTALS	**4,800**	1,404	859	0	1,604	591	200	73	43	26	0
Berg Brothers	**6,300**	2,402	547	3,108	0	150	0	41	32	20	0
Nespelem Bend	**517**	257	0	0	0	0	0	75	0	0	185
Redford Canyon	**221**	191	0	0	0	30	0	0	0	0	0
SUBTOTALS	**16,652**	6,264	2,360	3,108	2,656	1,365	208	336	75	60	220
NEW SAND HILLS	**1,394**	558	0	0	0	836	0	0	0	0	0
FRIEDLANDER	**60**	0	0	0	30	0	0	30	0	0	0
HINMAN	**770**	170	0	600	0	0	0	0	0	0	0
AGENCY MGT AREA	**2,388**	0	0	2,348	0	0	0	0	20	0	20
NEW TOTALS	**21,264**	6992	2360	6056	2686	2201	208	366	95	60	240

PROJECT ENVIRONMENT

Sand Hills Acquisition (1,350 acres)

Soils

The soils on this site are very deep, well drained to excessively drained. Soils are composed mostly of sandy glacial outwash of granitic origin with a component of volcanic ash and loess (Figure 2).

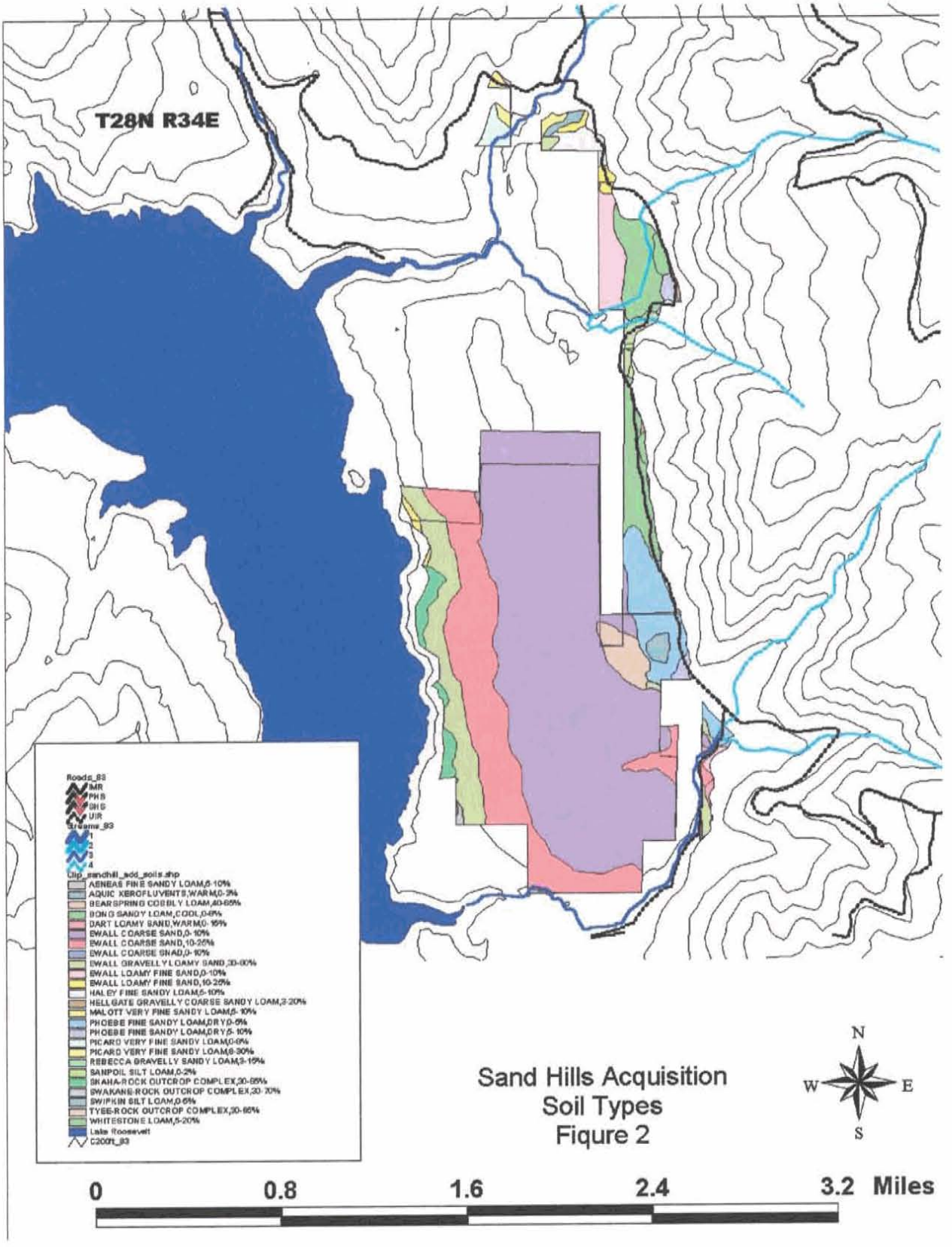
Location/Description

This property is an elevated ridge of sands and gravels deposited from the last ice age and lies east of the Columbia River (Lake Roosevelt) in Ferry County. Historically cattle and sheep grazed this area. Lack of fences bordering the property, resulted in grazing impacts over a long period of time. The area was logged in the past as evidence of tree stumps and skid trails that cover the property. A fire within the last ten years removed much of the shrub component and allowed noxious and unwanted vegetation to inhabit most of the northeast corner of the Sand Hills unit. In 1999 the area was fenced to prevent grazing by livestock. This key property combined two existing mitigation units, Sand Hills (Kuehne parcel) and Lundstrum Flat into one large continuous mitigation unit called the Sand Hills unit (Figure 3).

Vegetation

The vegetative cover on this parcel was described as conifer woodland and shrub-steppe habitat. Historically the warm, droughty conditions and sandy soils classify this area as the Ponderosa pine/Antelope bitterbrush habitat type, bluebunch wheatgrass phase (Clausnitzer and Zamora, 1987). The description for this habitat type is a xerophytic plant association dominated by Ponderosa pine with bitterbrush and bunchgrasses dominating the understory vegetation. The area was logged in the past favoring the proliferation of understory grasses. Shrubs, especially bitterbrush, dominated the landscape over time as season long grazing altered the grass and forb vegetation cover. Currently the area contains 836 acres of conifer woodland and 558 acres of shrub-steppe cover. On undisturbed sites the diversity is high with a variety of vegetative species occurring within this habitat type. Perennial bunchgrasses account for 26% cover with perennial forbs accounting for 21% canopy cover over the area. Ponderosa pine is the climax dominant with Arrowleaf balsamroot and silky lupine well represented on site. On disturbed sites (fire frequency or over grazing) Antelope bitterbrush can be poorly represented. Disturbed sites are well represented by Cheatgrass and noxious weeds. The remaining species (95) associated with this habitat type have very low abundances and/or occur infrequently on disturbed sites.

Shrub-steppe cover of the Sand Hills parcel consists primarily of xeric sites occupied by shrubs and herbaceous vegetation interspersed with bare ground, litter, and/or rock outcrops. Shrub-steppe habitat on this area is dominated by shrubs, either sagebrush or bitterbrush depending on soil types and available moisture. Rabbitbrush can be the dominant shrub species on disturbed sites. Serviceberry, current and chokecherry occur within this cover type on moister sites or at the base of rock outcrops. Some trees may be scattered throughout, primarily Ponderosa pine with less than 5 percent canopy closure over the entire area. Grasses and forbs include bluebunch wheatgrass, Idaho fescue, needle and thread grass, three awn grass, wildrye, crested wheatgrass, cheatgrass, yarrow, lupine, lomatium, cactus, and balsamroot. Where the area has


T28N R34E
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Clip_sandhill_add_soils.shp
ASNEAS FINE SANDY LOAM,5-10%
AQUIC XEROFLUVENTS,WARM,0-3%
BEARSPRING COBBLY LOAM,40-65%
BONS SANDY LOAM,COOL,0-8%
DART LOAMY SAND,WARM,0- 15%
EWALL COARSE SAND,0- 10%
EWALL COARSE SAND,10-25%
EWALL COARSE SNAD,0- 10%
EWALL GRAVELLY LOAMY SAND,30-60%
EWALL LOAMY FINE SAND,0-10%
EWALL LOAMY FINE SAND,10-25%
HALEY FINE SANDY LOAM,5-10%
HELLGATE GRAVELLY COARSE SANDY LOAM,2-20%
MALOTT VERY FINE SANDY LOAM,5- 10%
PHOEBE FINE SANDY LOAM,DRY,0-5%
PHOEBE FINE SANDY LOAM,DRY,5- 10%
PICARD VERY FINE SANDY LOAM,0-8%
PICARD VERY FINE SANDY LOAM,8-30%
REBECCA GRAVELLY SANDY LOAM,3-15%
SANPOIL SILT LOAM,0-2%
SKAHA-ROCK OUTCROP COMPLEX,30-65%
SWAKANE-ROCK OUTCROP COMPLEX,30- 70%
SWIPKIN SILT LOAM,0-5%
TYSE-ROCK OUTCROP COMPLEX,30-65%
WHITESTONE LOAM,5-20%
Lake Roosevelt
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Sand Hills Acquisition
Soil Types
Figure 2
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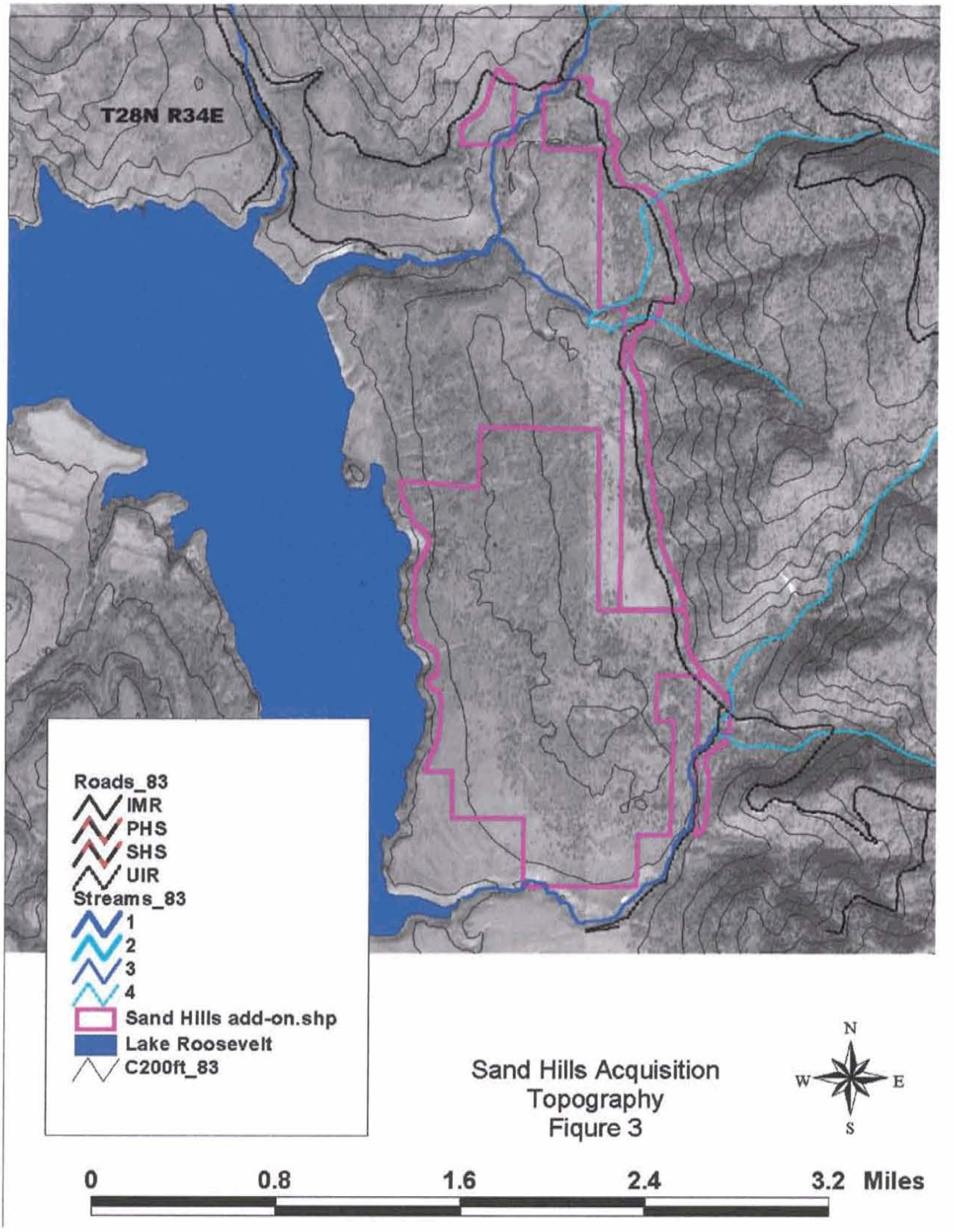
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been disturbed, cactus and noxious weeds especially the various species of knapweed can be found. Following are charts (Figures 4 and 5) of the vegetation species composition, past present and future.

Evaluation Species

Mule Deer (*Odocoileus hemionus*)

A Medium sized member of the *Cervidae* family that includes hoofed mammals having antlers shed annually. The mule deer inhabits coniferous forests and woodlands, shrub-steppe, and grasslands with shrubs. Typically mule deer are reddish brown in color with lighter or whitish undersides and inside of legs. The coat becomes grayer during winter months. The ears are large and mule-like, and the rump is white with a black-tipped tail. Mule deer are browsers that feed mostly on shrubs and twigs, but also add grasses and forbs to the diet depending on time of the year. This is an important species selected to represent species using the shrub-steppe and conifer woodland cover types. A recently published model (Ashley and Berger, 1999) was used to evaluate these cover types mentioned above. The model has ten variables to measure the suitability of shrub-steppe and conifer woodland/forest cover types. They are percent preferred shrubs less than 1.5 meters in height, number of preferred shrub species, mean shrub height, percent canopy cover of all shrubs less than 1.5 meters in height, percent canopy of palatable herbaceous species, presence of agricultural crops, aspect, road density, topographic diversity, and percent evergreen canopy greater than 1.5 meters in height.

Figure 4. Sand HillsShrub-Steppe Cover Type Plant Association, Past, Present, and Desired.

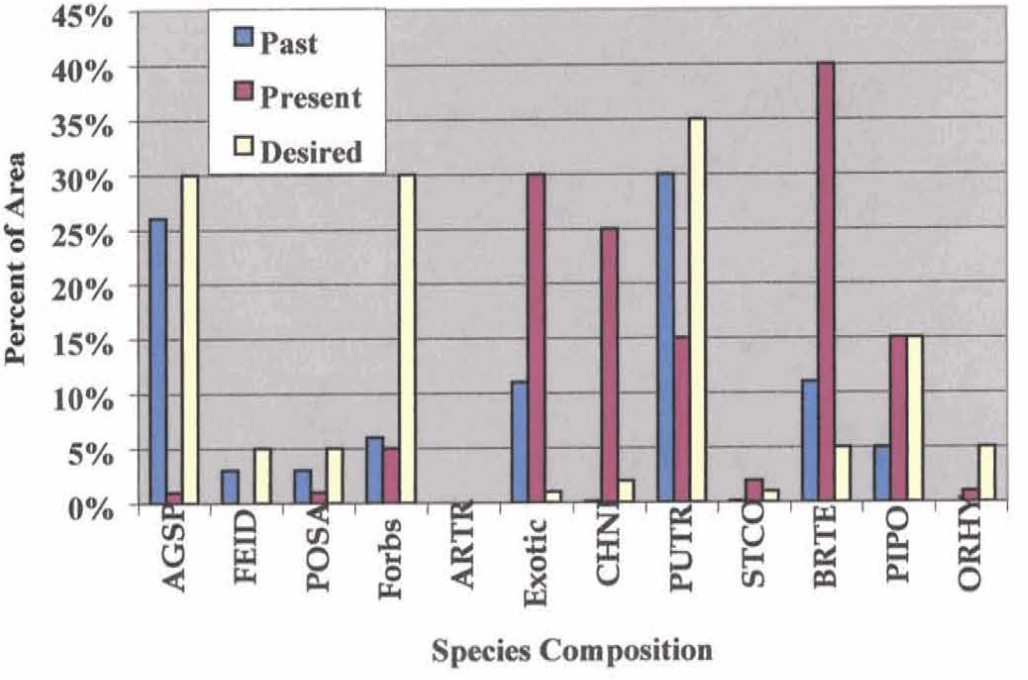


Figure 5. Sand Hills Conifer Woodland Cover Type Plant Association, Past, Present, and Desired.

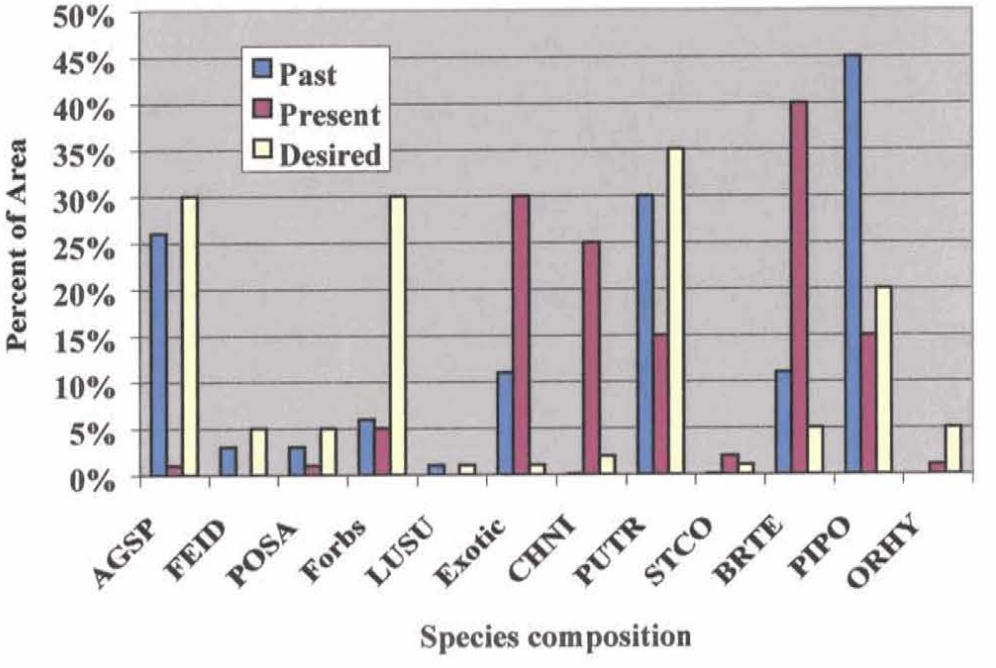


Figure 6. Typical Shrub-steppe Cover on Sand Hills unit.

Figure 7. Typical Conifer Woodland Cover on Sand Hills unit.

Figure 8. Conifer Regeneration on Sand hills Unit after fire.

Figure 9. Mule Deer (*Odocoileus hemionus*) on the Sand hills unit during winter.

Friedlander parcel (60 acres)

Soils

The soils of the area are mostly silty loam deposits and support a variety of vegetation (Figure 10).

Location/Description

This parcel was acquired to protect the riparian and upland habitats from unmanaged livestock grazing. This parcel (60 acres) along with the other acquired lands in the area will form the Friedlander unit (see topographic map figure 11). The unit contains six other parcels that lie within the South Fork of Nine Mile Creek watershed. Until this area was purchased for wildlife mitigation, it was subjected to season-long grazing. This land use along with past logging, altered the composition and growth of grasses, forbs, shrubs, and tree species found in the area. In addition to grazing impacts, skid-trails, downed logs, and stumps are evidence of past logging within the parcel. The South Fork of Nine Mile Creek, a perennial stream, runs through the entire length of Friedlander Meadows. The acquired parcel lies north of a mitigation parcel (60 acres) previously purchased, forming a large block of habitat bisected by the creek and Hellsgate road. Management actions such as boundary fencing, stream bank protection, restoring the woody component along the stream corridor, and weed control will eliminate some of the impacts from the past and allow desired habitat types to recover over time.

Vegetation

The Friedlander Parcel contains 30 acres of conifer woodland cover and 30 acres of riparian shrublands cover. The parcel is within the Nine Mile creek watershed and is habitat typed as a Douglas fir climax community with a component of Riparian-Shrub Wetlands along the creek drainage. The riparian area vegetation is fairly diverse and includes tufted hairgrass, mannagrass, Idaho fescue, orchard and reed canary grasses. Herbal species include horsetail (*Equisetum sp.*), rushes (*Juncus sp.*), camus (*Camassia quamash*), sedges (*Carex sp.*), and common cattail (*Typha latifolia*). Trees and shrubs include water birch *(Betula occidentalis*), Hawthorn (Crataegus sp.) alder (*Ulnas sp.*), willow (*Salix sp.*) and red-osier dogwood (*Cornus stolinefira*).

The conifer woodland vegetation includes Ponderosa pine, Douglas fir with understory shrubs such as oceanspray (Holodiscus discolor), rose, and current. Grasses include pine grass, cheatgrass, Idaho fescue and a variety of bluegrass and wheatgrasses. Noxious weeds are present where disturbance has altered the ground cover (logging and grazing).

Evaluation Species

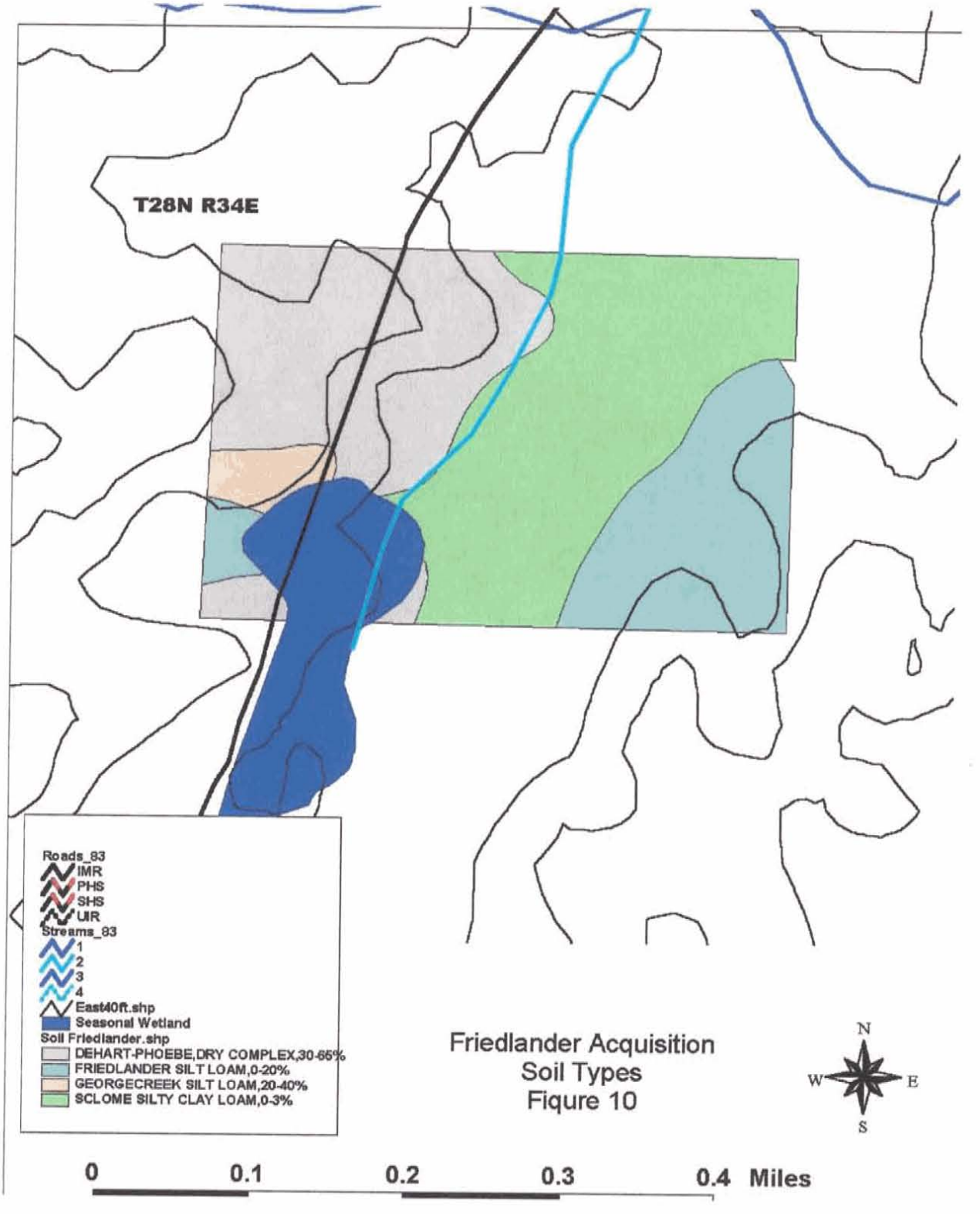
Mink (*Mustela vison*)

One of the *Mustelidae* family that includes weasels, skunks, river otters, fishers, and martens. This family includes forbearing mammals with anal scent glands. Mink have long slender bodies, short rounded ears, and short legs. Mink inhabit essentially aquatic areas and are never far from water. They are found in marshes, swamps, ponds, lakes, and rivers. They are chiefly nocturnal, excellent swimmers, and prey on small mammals, bird eggs, frogs, crayfish, and fish. The mink model (Allen, 1986) was used to evaluate the riparian shrublands on this parcel. This species represents wildlife using stream-edge and wetland areas. Riparian shrubland is extremely important habitat in dry environments. Six variables are used to evaluate the

suitability of this cover type for mink. The first variable measured the percent of the year that surface water was present. The next variable measured the percent of tree canopy cover. The third variable measured the percent of shrub canopy cover. The forth variable measured the percent of canopy cover of emergent vegetation. The fifth variable measured the percent of canopy cover of trees and shrubs within 100m of the wetland edge. The last variable measured the percent of canopy cover within 1 m of the shoreline.

Downy Woodpecker (*Picoides pubescens*)

The Downy woodpecker is a member of the *Picidae* family that includes chisel-billed, wood boring birds with strong zygodactyls feet (usually two toes front, two rear), long tongues, and stiff spiny tails for climbing. This species looks like a smaller version of the Hairy woodpecker, checkered and spotted with white and black markings, with white backs and only the males have a small red patch on the back of the head (see figure 11). The bill on the Downy woodpecker is much smaller than the Hairy woodpecker and is used for identification at close range. A published Downy woodpecker model (Schroeder, 1983) was used to evaluate the conifer woodland habitat. Primarily an insectivore, that feeds by digging into tree bark with the bill, by gleaning along the bark surface, and sometimes fly-catching. They are not strong excavators so major food sources are beetles, ants and caterpillars. They make use of all available foraging habitat during winter in order to find adequate amounts of food. Cover and reproductive requirements are met by the presence of soft snags found in open coniferous or deciduous stands. The model used two variables to determine the food and reproductive requirements of this species. The variables measured the basal area and number of snags greater than 6 inches at diameter breast height (dbh) per acre.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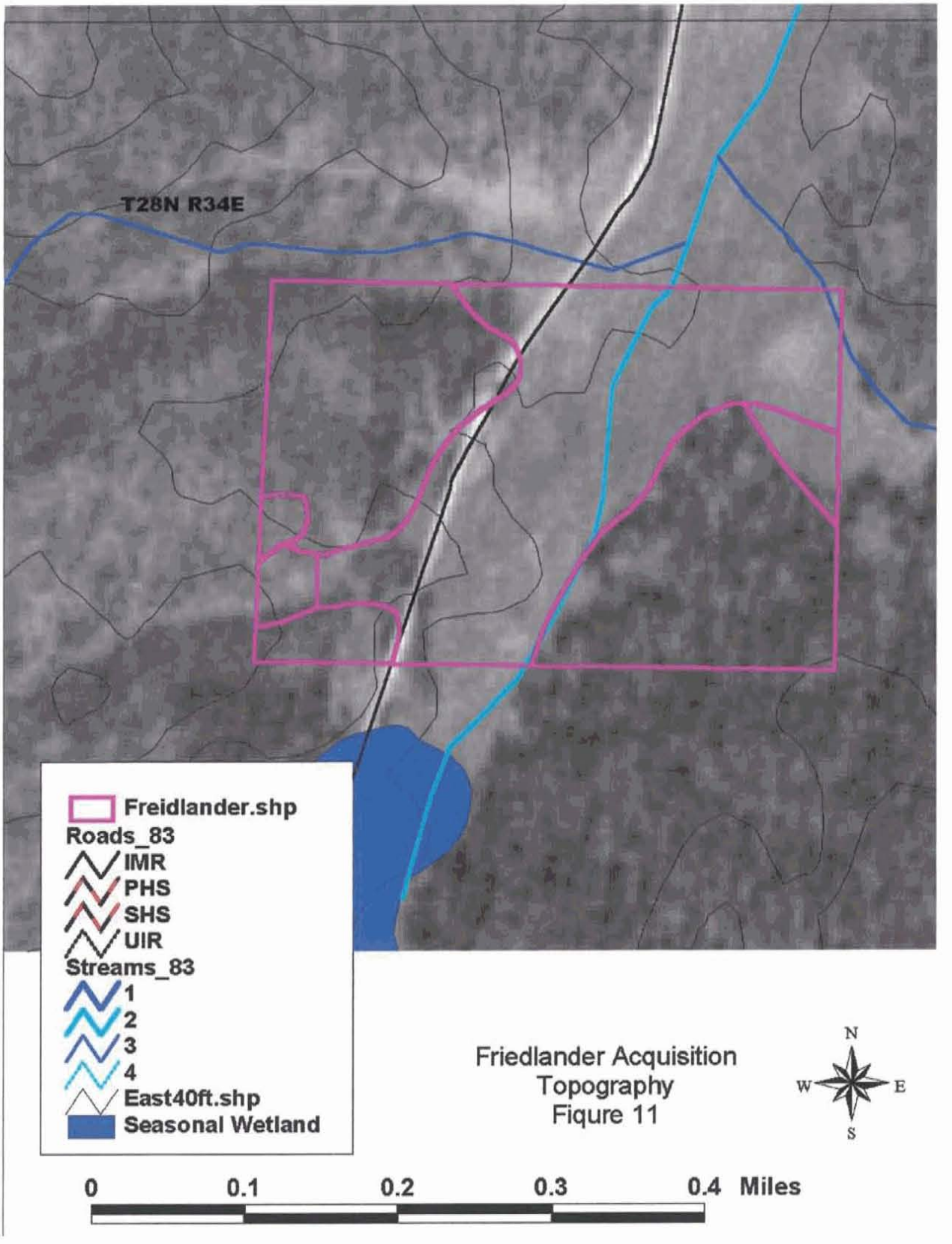
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Figure 12. Friedlander Riparian Cover Type Plant Association, Past, Present and Desired.

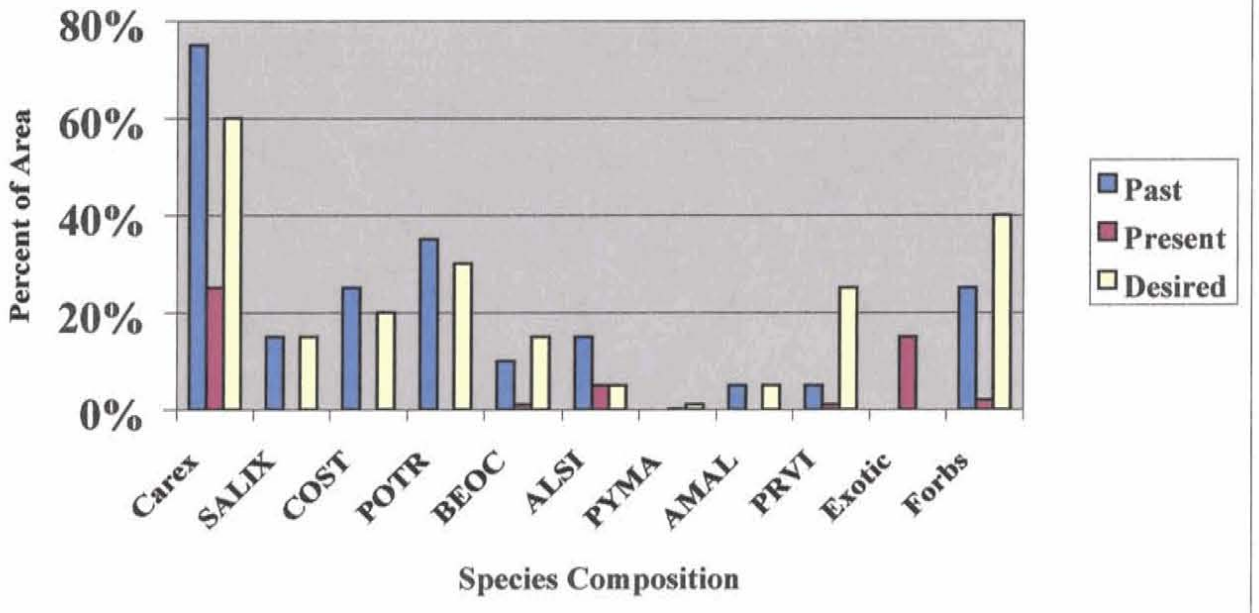


Figure 13. Friedlander Conifer Woodland Cover Type Plant Association, Past, Present and Desired.

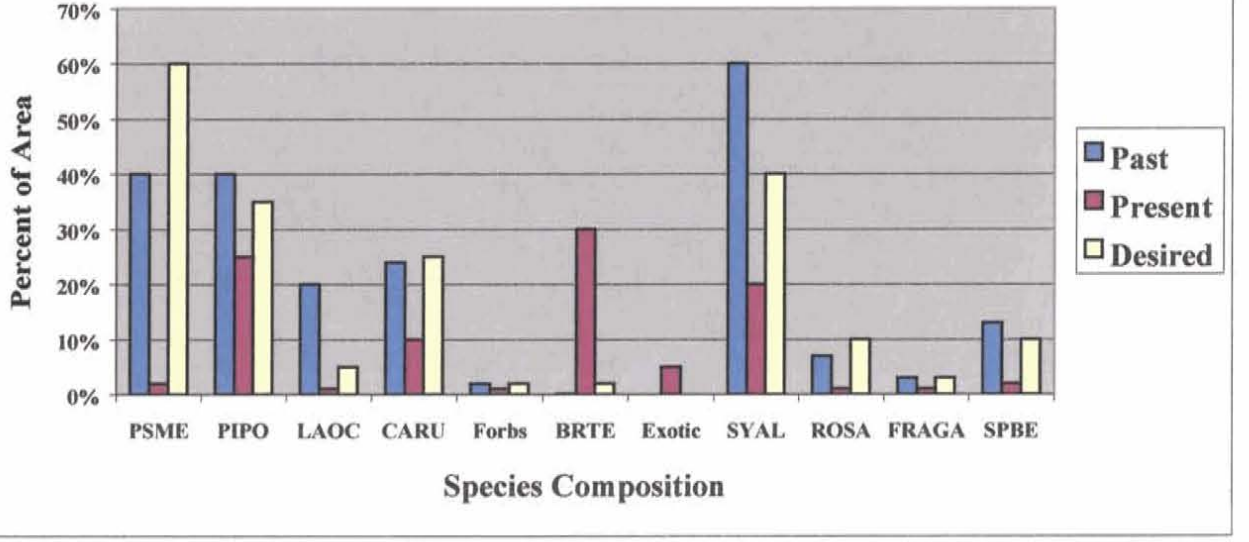


Figure 14. Friedlander Conifer Woodland Cover.

Figure 15. Adult Male Downy Woodpecker (*Picoides pubescens*).

Figure 16. Friedlander Riparian Cover.

Figure 17. Photograph of a Mink (*Mustela vison*).

Agency Butte Special Management Unit (2,388 acres) and Hinman Acquisition (770 acres)

Soils
The soils of this unit are mostly stoney loam with rock outcrops (volcanic basalt and talus hillsides) along the west edge. The center of the unit contains a ridge running southeast to northwest that is composed of boulder outcrops mixed with fine sandy loam. The west side of the unit contains more fine sandy loam compared to the east side that is composed mostly of stoney loam. Figure 18 is a soil map of the unit with the Hinman parcels outlined in black.

Location/Description
This unit lies northeast of the Agency Campus and southeast of the town of Nespelem. The unit is triangular and is bounded on the west by Highway 155, on the north by Cache Creek road, and on the south by the Agency Cut-off road (see Figure 19 location map.). This unit is a large butte-like mound rising from the east to the west and covered mostly by grasses and forbs. The few large drainages on the unit support scattered stands of shrubs and trees. The west side has the highest elevation and abruptly drops creating weathered talus outcrops (rock habitat type) with trees and shrubs on deeper soils to Highway 155. Semi-permanent ponds occur in wet years and along the draw in the southwest corner of the unit. There are no structures on the unit and only one access/farm road which courses through the unit. The unit is fenced along the major roads except along Highway 155 with some old interior fencing. The area was used in the past to pasture livestock but had not been used for many years before acquisition. This area contains the largest population of sharp-tailed grouse in Washington State.

Vegetation
The cover vegetation on these parcels consists of four types; grassland, riparian, rock, and conifer woodland. A description of each cover type follows:

Grassland
This cover type (680 acres on the Hinman acquisition and 2,348 acres on the Agency Butte special management area) is composed mainly of grasses and forbs with few shrubs (big sage and currant) and the occasional Ponderosa pine tree over a large area. The community composition depends on the underlying soils and available moisture. Species include bluebunch wheatgrass, Idaho fescue, bluegrasses, basin wildrye, cheatgrass, needle-and-thread, lomatium sp., prickly phlox, brodia, yarrow, mullein, buckwheat (Eriogonum sp.) and noxious weeds.

Riparian
The riparian cover type (20 acres) is described as vegetated wetlands such as marshes, shallow permanent or intermittent water bodies like ponds, bays, coves or slack water with emergent vegetation and some shrubs/trees. Grasses include tufted hairgrass, mannagrass, Idaho fescue, Orchard grass and reed canary grass. Herbal species include horsetail (*Equisetum sp.*), rushes (*Juncus sp.*), camus (*Camus quamash*), sedges (*Carex sp.*), and common cattail (*Typha latifolia*). Trees and shrubs include water birch *(Betula occidentalis*), aspen (*Populous tremuloides*), and Ponderosa pine on the uplands.

Rock
This cover type (20 acres) is comprised of steep topography, usually excluding grazing. Found mainly on major rock outcrops along the Columbia River and exposed bluffs within the wastersheds associated with this river. Vegetation includes deep shrubs, principally serviceberry (*Amelanchier alnifolia*) and mockorange (*Philadelphus lewisii*). Herbaceous plants include cheatgrass, bluebunch wheatgrass, Arrowleaf balsamroot, Sandberg bluegrass (*Poa sandbergii*) and bitterroot (*Lewisia rediviva*).

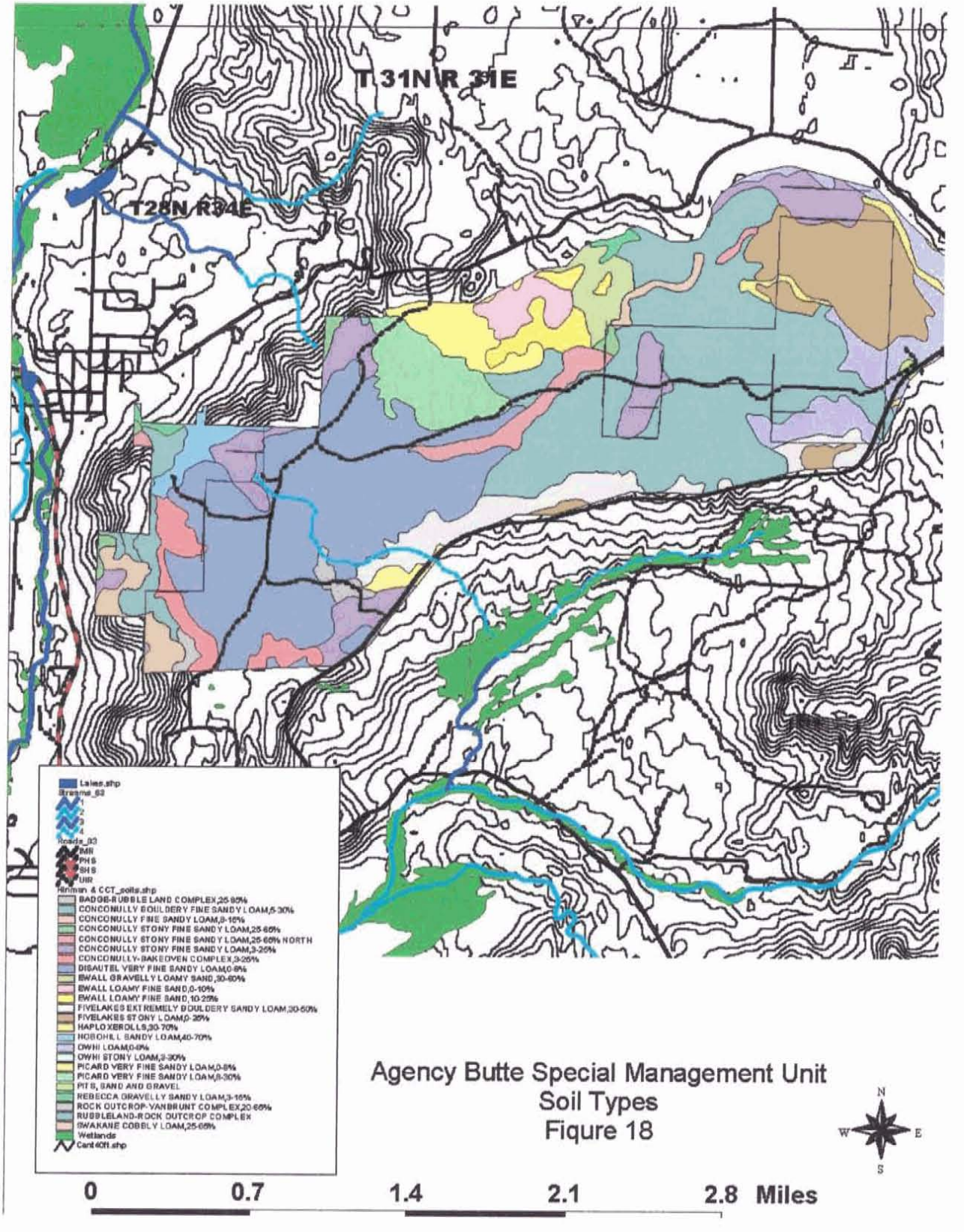
Conifer Woodland
This cover type (90 acres) consists of scattered clumps of Ponderosa pine trees located on deeper soils along the draws or on the steep west-facing side of this unit.

Evaluation Species
Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*) are typically found in grassland and shrub-steppe cover. This area being evaluated for this study contains the largest population within Washington State. This bird is about the size of a hen pheasant only light gray with a stuby tail. The males (cocks) of this species display on communal dancing grounds called "leks" intensely in spring. Leks are organized into small territories with discrete concentric boundaries and show a high degree of stability from year to year. The most dominant males occupy the innermost rings. Females walk onto the lek and work their way to the center for breeding. The birds require good visibility on the lek to display and detect predators, but the lek should have surrounding escape cover.
Nesting Requirements – nesting normally occurs within a mile or so of the lek. Structural diversity of habitat, including well-developed grasses, forbs and shrubs is a critical element of high quality nesting habitat. A modified Robel pole was used to measure residual vegetation for cover and nesting material.
Brooding Habitat – young chicks need openness, insects and warmth during their first two weeks of life. Bunchgrasses provide a combination of openness and cover which appears to be beneficial to young broods. The percent slope and distance between nesting and winter habitat was measured for suitability.
Adult and Fledged Young Habitat Requirements – both use a mixture of grassy openings and brushy cover in summer. Upland and riparian shrubs provide shade and escape cover, while open sites continue to be used for feeding during the cool parts of the day. Grouse use shrub-steppe, alfalfa, oat, barley, and/or wheat stubble in the fall. In winter data indicates that grouse subsist on deciduous trees and shrubs, especially water birch trees. Other important shrubs include; serviceberry, chokecherry, snowberry, rose, hawthorn, and quaking aspen. The most important aspect of winter habitat for grouse is cover that allows birds to feed, avoid predators, and maintain body temperature. When deep soft snow is available; grouse stay warm and escape predators by burrowing in snow. Residual bunchgrasses also provide important winter cover, because the growth form allows them to remain erect in snow. The winter food/cover variables were measured using an unpublished model modified from the USFWS Plains Grouse model (Schroeder and Ashley, 1999). This model was used to measure this cover types suitability for sharp-tailed grouse.

Bobcat (*Felis rufa*)
A medium sized cat commonly found with thick soft yellow-brown fur above and flecked with black and whitish blotches with black spots below. Upper parts of legs banded. Males are larger than females. Bobcats are found over most of the USA and are common in Washington State. Habitat preferences include shrubs, open woodlands, forests, rocky deserts, and even swamps. Bobcats feed on a wide range of animals up to the size of deer. On the Colville Reservation they feed on woodrats, porcupines, small mammals, and birds. This species was selected to represent species using the rock cover type. Species anticipated to benefit from management of this cover type include bobcat, yellow-bellied marmot, bushy-tailed woodrat, cotton-tailed rabbit, quail, golden eagle, and rattlesnake. An unpublished bobcat model developed for this area (Bodurtha, 1991) was used to evaluate the rock cover type. This model uses four variables to measure the suitability of an area for bobcat. They are percent canopy cover of herbaceous vegetation, shrub distribution, percent canopy cover of shrubs, and percent of area composed of rock piles, rock outcrops, rocky ledges, boulder fields, talus slopes, and cliffs.

Yellow Warbler (*Dendroica petechia*)
Family Emberizidae, sub-family Parulidae that describes active, brightly colored birds, usually smaller than sparrows, with thin, needle pointed bills. This species was chosen to represent species dependant upon riparian shrub cover for life requirements. A published yellow warbler model (Schroeder, 1987) was used to evaluate the semi-permanent ponds on this unit. The model consists of three variables; percent deciduous shrub crown cover, average height of deciduous shrubs, and percent of deciduous shrub canopy comprised of hydrophytic shrubs.

Downy Woodpecker (*Picoides pubescens*)
The Downy woodpecker is a member of the *Picidae* family that includes chisel-billed, wood boring birds with strong zygodactyls feet (usually two toes front, two rear), long tongues, and stiff spiny tails for climbing. This species looks like a smaller version of the Hairy woodpecker, checkered and spotted with white and black markings, with white backs and only the males have a small red patch on the back of the head (see figure 11). The bill on the Downy woodpecker is much smaller than the Hairy woodpecker and is used for identification at close range. A published Downy woodpecker model (Schroeder, 1983) was used to evaluate the conifer woodland habitat. Primarily an insectivore, that feeds by digging into tree bark with the bill, by gleaning along the bark surface, and sometimes fly-catching. They are not strong excavators so major food sources are beetles, ants and caterpillars. They make use of all available foraging behavior during winter in order to find adequate amounts of food. Cover and reproductive requirements are met by the presence of soft snags found in open coniferous or deciduous stands. The model used two variables to determine the food and reproductive requirement s of this species. The variables measured the basal area and number of snags greater than 6 inches at diameter breast height (dbh) per acre.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BADGE-RUBBLE LAND COMPLEX,25-95%
CONCONULLY BOULDERY FINE SANDY LOAM,5-30%
CONCONULLY FINE SANDY LOAM,8-15%
CONCONULLY STONY FINE SANDY LOAM,25-65%
CONCONULLY STONY FINE SANDY LOAM,25-65% NORTH
CONCONULLY STONY FINE SANDY LOAM,3-25%
CONCONULLY-BAKEOVEN COMPLEX,3-25%
DISAUTEL VERY FINE SANDY LOAM,0-8%
EWALL GRAVELLY LOAMY SAND,30-60%
EWALL LOAMY FINE SAND,0-10%
EWALL LOAMY FINE SAND,10-25%
FIVELAKES EXTREMELY BOULDERY SANDY LOAM,30-60%
FIVELAKES STONY LOAM,0-25%
HAPLOXEROLLS,30-70%
HOBOHILL SANDY LOAM,40-70%
OWHI LOAM,0-8%
OWHI STONY LOAM,3-30%
PICARD VERY FINE SANDY LOAM,0-8%
PICARD VERY FINE SANDY LOAM,8-30%
PITS, SAND AND GRAVEL
REBECCA GRAVELLY SANDY LOAM,3-15%
ROCK OUTCROP-VANDRUNT COMPLEX,20-65%
RUBBLELAND-ROCK OUTCROP COMPLEX
SWAKANE COBBLY LOAM,25-65%
Wetlands
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Agency Butte Special Management Unit
Soil Types
Figure 18
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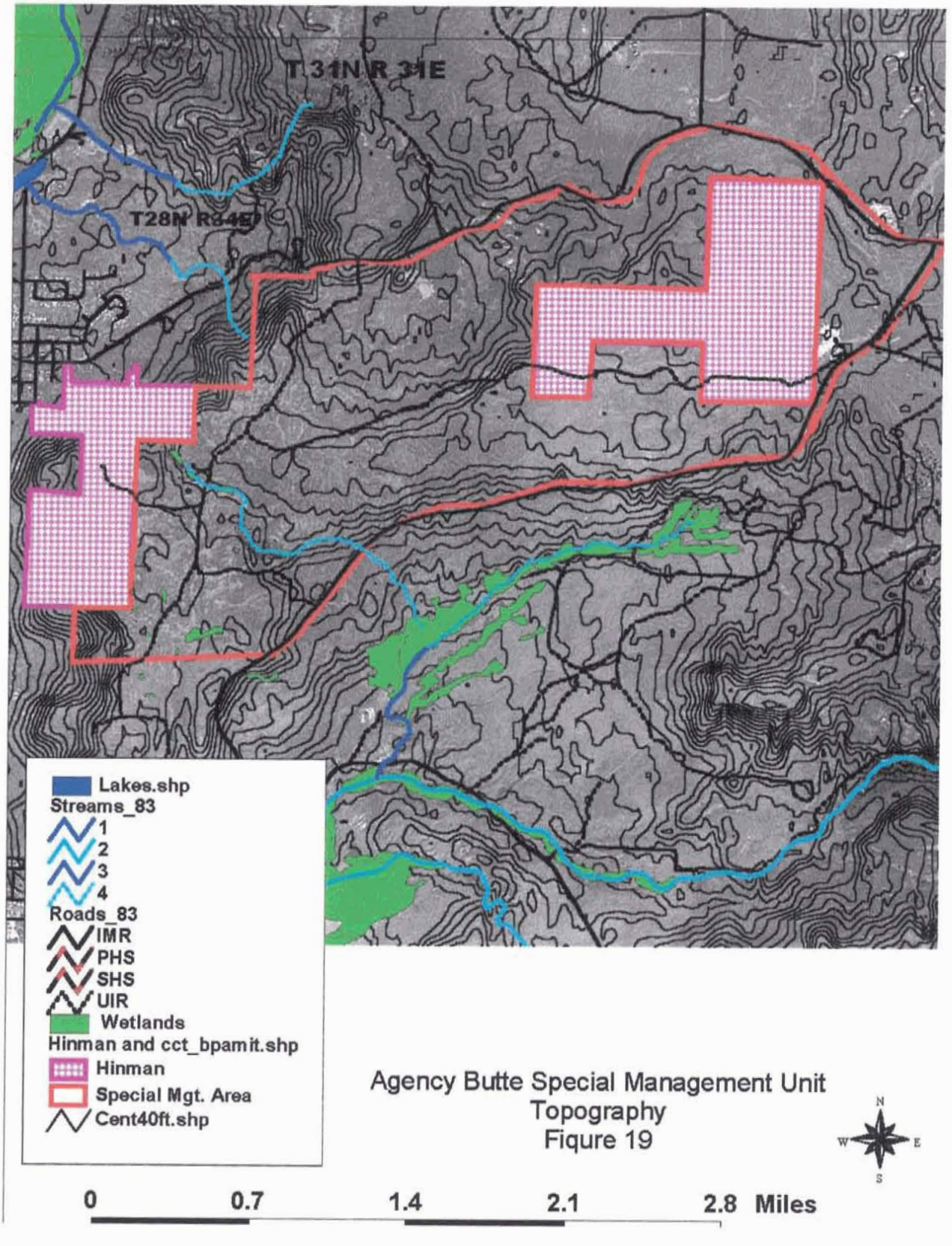

Agency Butte Special Management Unit
Topography
Fiqure 19

Figure 20. Agency Butte Unit Cover Type Plant Association, Past, Present, and Desired.

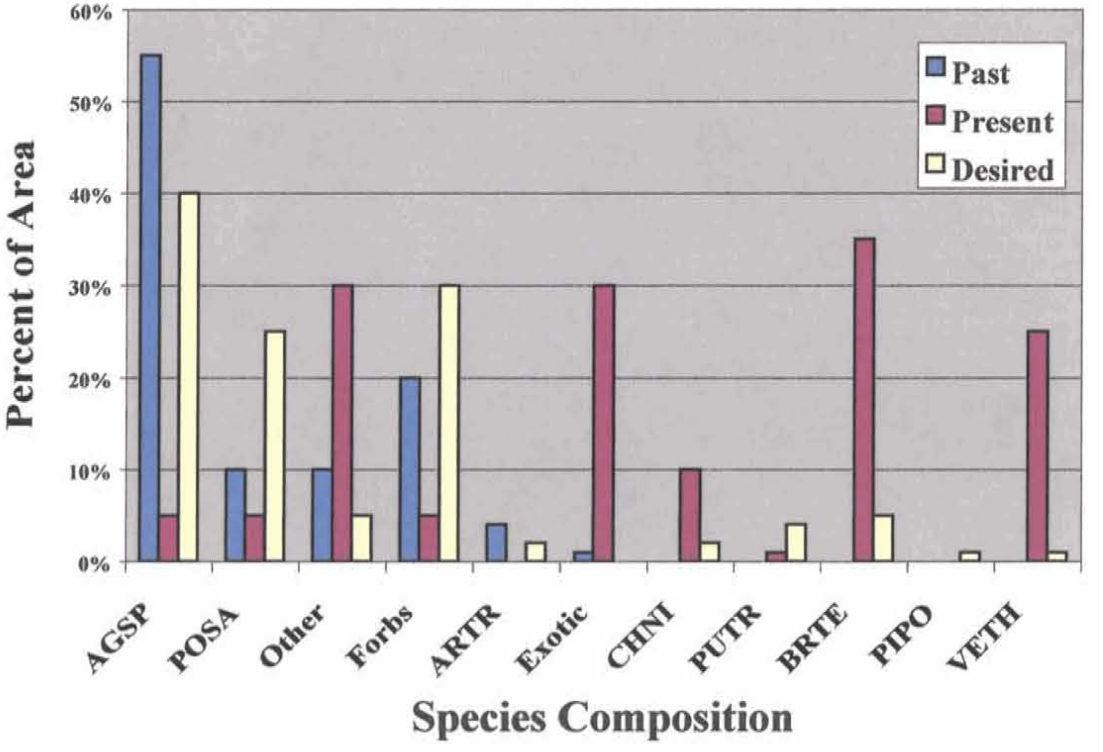

Figure 21. Bluebunch Wheatgrass on former Hinman Property.

Figure 22. Sharp-tailed Grouse on the Agency Butte unit

Figure 23. Semi-permanent pond on Agency Butte Special Management Area.

Figure 24. Picture of a Yellow Warbler (*Dendroica petechia*).

Figure 25. Semi-permanent pond on Agency Butte Special Management Unit.

Figure 26. Rock Cover Type on Agency Butte Special Management Unit.

Figure 27. Photograph of a Young Bobcat (*Felis rufus).*

METHODS

Once the properties were acquired a Habitat Evaluation Procedure (HEP) assessment took place to determine baseline values for wildlife. HEP was developed by the U.S. Fish and Wildlife Service (USFWS) to document the non-monetary value of wildlife resources on these lands. Specifically the current quality of available habitat for selected species. HEP provides information for two general types of wildlife comparisons: 1) the relative value of different areas at the same point in time, and 2) the relative value of the same area at future points in time. By combining the two types of comparisons, the impact of proposed or anticipated land and water use changes on wildlife habitat can be quantified.

HEP is based on ecological principals and the assumption that habitat for selected wildlife species can be described as a numerical value known as a Habitat Suitability Index (HSI). This value is derived from an evaluation of the ability of key habitat components to supply the life requisites of selected species of fish and wildlife. Evaluation involves using the same key components to compare existing habitat conditions with optimum habitat conditions for a selected species.

The HSI value ranges from 0.0 to 1.0 with 1.0 being the optimum value of any habitat. The HSI value is then multiplied by the area of available habitat to obtain Habitat Units (HU's), which for mitigation purposes are the "currency" used to measure/compare habitat losses and gains.

In addition the USFWS developed published "Species Models" called blue books because of the covers to aid in using the HEP. . HEP models were selected, created, and/or modified based on habitat conditions and evaluation species needs/behavior as recommended by USFWS. Three USFWS species models, the Mink, Downy Woodpecker, and Yellow Warbler were used for this study. Species models had to be developed and/or modified from other studies to evaluate habitat conditions for Bobcat (Bodurtha, 1991), the Sharp-tailed grouse and Mule deer (Schroeder and Ashley, 1999 and Ashley and Berger, 1999).

Selection of evaluation species was based on loss assessments for Grand Coulee and Chief Joseph Dams. In general, a single HEP species model represents the life requirements for the evaluation species and those species using that particular cover type. Therefore, HSI values measured in a specific cover type can represent the habitat quality for a wide range of species occupying the same habitat.

A HEP study consists of several required steps that must be completed throughout the evaluation. These steps are as follows:

1. Form an assessment team to determine if HEP is applicable.
2. Define study objectives.
3. Assemble baseline data.
4. Delineate cover types.
5. Select evaluation species/HSI models.
6. Select inventory techniques.
7. Select a sampling design.
8. Collect field data.
9. Analyze field data.
10. Report findings.

Assessment team membership was developed with the first land acquisition for the Hellsgate Project. To standardize the data collection and evaluate similar habitat types the team was comprised from agencies involved with the mitigation process and who had knowledge of the sites to be evaluated. Most of the team members were qualified in HEP and used existing or modified unpublished HSI models for this evaluation.

The objectives set forth for this HEP study were to rate the quality of different habitats on the new acquisitions and/or management area for mitigating wildlife losses that occurred from Grand Coulee and Chief Joseph Dams. The main objective for the former Hinman property and surrounding special management area was to protect and enhance critical habitat for the state threatened sharp-tailed grouse. The Sand Hills acquisition objective was to protect, enhance, and restore critical winter range for deer and elk. Additionally this purchase linked two other mitigation areas into one large management area. The Friedlander parcel was purchased and added to the other Friedlander parcels to protect, manage, and enhance the riparian and upland areas of the south fork of Nine-mile creek. Objectives to reach the goals involved standardizing cover type descriptions, habitat variable measurement techniques and survey results

Baseline data was assembled using all available resources including data supplied from the Tribes Resource Inventory and Analysis Department (GIS).

Study area boundaries were determined from legal descriptions and delineated on 1:24,000 U.S. Geological Survey (USGS) maps. Project information was obtained from a variety of sources including the Natural Resource Conservation Service (NRCS), Colville Confederated Tribes (CCT) database, CCT Fish and Wildlife Department, Tribal members, and non-members. Maps, soils data, aerial photos, LANDSAT imagery, land use details, hydrological, and wildlife information was compiled for each project site.

Wildlife cover types were defined in accordance with CCT, WDFW, and USFWS guidelines. Cover type information was plotted on 1:24,000 Tribal GIS maps (cover types encompassing less than 1% of the study area were not delineated as separate polygons). HEP model selection was based on project area cover types and the models used to determine loss assessments for Grand Coulee and Chief Joseph Dams (USDOE. January 1992.).

A field HEP team gathered the habitat data for analysis. Survey start points were determined prior to field data collection. Transects route azimuths were randomly selected and actual transect locations were permanently marked and recorded on a GIS unit. The habitat variable data for the HEP study was collected using standard measurement techniques (Hays et al., 1981).

Figure 28. Modified Daubenmire Plot Technique to Measure % Ground Cover.

Figure 29. Modified Robel Pole Technique for Visual Obstruction Readings (VOR).

Figure 30. HEP data collection devices on Agency Butte.

Table 2. HEP Field Sampling Techniques used for this study.

SPECIES	TECHNIQUE	VARIABLES
Mule Deer	Line Intercept	% Preferred Shrubs
	Line Intercept	% Evergreen Veg. > 2m Tall.
	Line Intercept	% Total Shrub Crown Cover
	Tape Measure	Height of Shrubs
	Topographic Maps	Variable Topography/ Slope
	Aerial Photos/Maps	Road Density
	Compass	Aspect
Mink	Aerial Photos/Maps	% Of Year Water Present
	Line Transect	% Canopy Cover < 100m Wetland's Edge
	Line Transect	% Canopy Cover < 1m Of Water's Edge
Yellow Warbler	Line Transect	% Deciduous Shrub Crown cover < 5m Tall
	Tape Measure/Count	Average Height Of Deciduous Shrub Canopy Cover
	Line Intercept/Count	% Crown Cover Comprised Of Hydrophytic Shrubs
Downy Woodpecker	Bitterlich Method	Basal Area at dbh
	Dbh Tape/Quadrat	# of Snags> 15 cm (6 inches) dbh per 0.4 ha (1 ac)
Bobcat	Line Transect	% Herbaceous Cover
	Line Transect	% Canopy Cover of Shrubs
	Aerial Photos/Maps	% Area of Rock
	Aerial Photos/Maps	Shrub Distribution
Sharp-tailed Grouse	Robel Pole	Vertical Obstruction Reading from Ground Cover
	Micro Plot	% Grasses and Forbs
	Aerial Photos/Maps	Distance Between Cover Types / Winter Range
	Line Transect	% Available Cover

Model Assumptions

A wide variety of birds, mammals, amphibians, and reptiles, including several threatened and sensitive wildlife species inhabit and/or utilize project lands on a seasonal basis. Wildlife distribution, diversity, and abundance are largely dependent upon the availability of suitable habitat. HEP model variables are used to determine the quality as well as the quantity of specific habitat attributes such as shrub canopy closure, tree height, snags per acre, etc. In addition to measuring specific habitat variables and following guidelines/formats, the following assumptions were made in order to clarify implied model attributes and/or modify the models to fit conditions found at project sites.

Mule Deer (*Odocoileus hemionus*) represent wildlife using browse, forbs and grasses as well as thermal cover and varied topography. This species is of cultural significance to the Tribes and a published HEP model was used for this evaluation with these stated assumptions. It is assumed that browse and forage values can be estimated by assessing the standing crop of vegetation and that aspect and public roads will reduce winter mule deer range quality. Topography alone cannot provide optimal thermal cover and in many areas mule deer are relegated to utilizing whatever winter range is available regardless of condition. Model uses are cautioned not to overestimate the quality of winter range based on mule deer use alone.

1. Water is not a limiting factor.
2. Area is large enough to support resident and/or migratory populations.

3. Winter food values can be estimated by measuring shrub browse diversity and quantity.
4. Grass and forbs do not contribute significantly towards winter dietary needs.
5. Deep snow conditions reduce the value calculated for food.

Mink (*Mustela vison*) represent species in and around wetland areas. A carnivorous furbearer that feeds upon a wide range of vertebrates and utilizes river shorelines and shallow water habitats. This species is of cultural significance to the Tribes and a published HEP model was used for this evaluation with these stated assumptions.

1. The model could be used to evaluate riparian habitat regardless of presence or absence of mink.
2. The model measures habitat variables not the presence/absence of species.
3. Water was not a limiting factor due to year round stream.

Yellow Warbler (*Dendroica petechia*) represent species that make extensive use of adjacent wetlands and reproduce in the riparian shrub habitat. This species is a good indicator of habitat conditions for neo-tropical bird species particularly nesting and rearing habitat. A published HEP model was used in the evaluation study with these stated assumptions.

1. The model measures habitat variables not the presence/absence of species.
2. Area is large enough to support resident and/or migratory populations.
3. The reproductive value is equal to the HSI value.

Downy Woodpecker (*Picoides pubescens*) represents species using the conifer woodland and forest habitats to meet life requirements. This species is a good indicator of habitat health and allows for more diversity by providing nest areas for other bird species. A published model was used with these stated assumptions.

1. No minimum habitat area limitations.
2. The reproductive value is equal to the HSI value.
3. The model measures habitat variables not the presence/absence of species.

Bobcat (*Felis rufus*) represents both predator and prey species using the rock habitat type. This unique geologic feature and supporting communities is well described using the unpublished bobcat model with these stated assumptions.

1. Water is not a major factor in habitat distribution.
2. No minimum habitat area limitations although urbanization limits suitable habitat.
3. Model only applies to steep, broken, rocky, canyon land habitat of the Columbia River corridor in the sagebrush steppe region of the Columbian Plateau in north-central Washington.
4. Area must support a prey base and its abundance is related to the extent of Herbaceous and shrubby vegetation.
5. Distribution of shrub cover and structure directly related to habitat use by bobcat.
6. Rock habitat was well distributed throughout the area.
7. Bobcat preferred the rock habitat type.

Sharp-tailed Grouse (*Tympanuchus phasianellus columbianus*) represents native and upland species relying on grass and sagebrush communities for food and cover. State threatened and of

cultural significance to the Tribes, this species was used in the evaluation with the following assumptions.

1. Lek sites do not represent suitable nesting/brood rearing habitat.
2. Residual nesting vegetation should be measured prior to spring green-up.
3. Winter forage below 4m is of greater value than forage at canopy levels > 4m.

DISCUSSION and RESULTS

New acquisition lands totaling 4,612 acres were evaluated using HEP to determine baseline HU's for mitigation credits.

The Sand Hills was evaluated using the winter range mule deer model. The area was broken down into two distinct cover types (shrub-steppe and conifer woodland) to rate this area for mule deer. The area rated on HSI of 0.5 for shrub-steppe and an HSI of 0.4 for conifer woodland for this species. This area has great potential because it is critical winter range for both deer and elk. Human disturbance is minimal during the winter months and the area contains preferred vegetation. Through past land use (primarily cattle grazing) the quantity and quality of forage is lacking. Management efforts to enhance existing habitat and increase the habitat suitability index on this site may include one or more of the following; excluding livestock, pruning existing shrubs, controlled burns, planting desired grasses, forbs and shrubs, and finally maintaining an overstory canopy cover. When protection and enhancement measures are in place, this core area will be better habitat for all species utilizing conifer woodland and shrub-steppe habitat types. The overall area lacks diversity and the majority of forage base is becoming unreachable or unpalatable due to age. Without management the rating for this species on this area will go down over time.

Grasslands on/around the Hinman acquisition within the Agency Butte Special Management Area were evaluated for sharp-tailed grouse. The area had an HSI of 0.4 on the flats and HSI of 0.5 on the rolling hills. Sharp-tailed grouse use the flat areas for feeding and lekking, but only seasonally. These areas lack hiding cover and quality forage for young birds. The rolling hills have adequate nesting/hiding cover and provide more diversity for foraging. The area does not rate as high as it should due to the vegetative species composition (ground cover). The area is used by the grouse because of the large amount of available grassland habitat verses the low population numbers competing for available resources. In addition, this area is remote so human disturbance to the birds is minimal and suitable winter range areas are close by.

The Agency Butte area also contains semi-permanent wetland areas that were evaluated for the Yellow warbler. This species rated and an HSI of 0.08 (very poor) due to lack of hydrophytic shrubs around the wetlands for nesting, cover and perching.

The Agency Butte area contains several rock bluffs with talus slopes that were evaluated for Bobcat. The area rated an HSI of 0.4 (poor) due to lack of cover needed by this species and its prey base. In addition, the area lacked denning sites.

Small patches of conifer trees on the Hinman acquisition were evaluated using the Downy woodpecker model. The conifer woodland cover type on this parcel rated an HSI of 0.2 (very poor) for the Downy woodpecker. The low rating for this species model was due to habitat fragmentation and lack of structure needed by this species.

Both the Downy woodpecker and Bobcat evaluations had poor ratings in part because of the lack of large areas of contiguous habitat not impacted by human caused disturbances.

Future actions by management will include increasing the amount and quality of habitat available for these evaluation species.

The Friedlander parcel contained two habitat types conifer forest and riparian which were rated using the downy woodpecker and mink models. The riparian HSI for mink rated 0.2 because it lacked habitat attributes of cover and structure for hiding and/or denning. Past land uses of this area modified this riparian habitat to produce hay and/or pasture for livestock. Past land uses adversely impacted the habitat attributes for mink and other riparian dependant species. This parcel also contains conifer forest habitat that rated an HSI of 0.2 for the Downy woodpecker model. The forested portion of this parcel rated low for the Downy woodpecker because it has been logged opening the canopy closure and reducing the amount of available food in the form of down woody material required by this species. As the area grows through succession over time with management, the HSI for this species on this parcel should go up corresponding to more favorable habitat conditions.

Table 3. Summary of HEP Results for Evaluated Areas.

PARCEL	ACRES	COVER TYPE	SPECIES	HSI	HUs
Sand Hills	558	Shrub-steppe	Mule Deer	0.5	279
Sand Hills	836	Conifer Woodland	Mule Deer	0.4	334
Hinman	680	Grassland	Sharp-tailed Grouse	0.5	340
Hinman	90	Conifer Woodland	Downy Woodpecker	0.2	18
Agency Butte	2,344	Grassland	Sharp-tailed Grouse	0.4	938
Agency Butte	20	Riparian	Yellow Warbler	0.08	2
Agency Butte	20	Rock	Bobcat	0.4	8
Friedlander	30	Riparian	Mink	0.2	6
Friedlander	30	Conifer Forest	Downy Woodpecker	0.2	6

LITERATURE CITED

Allen, Arthur W. 1986. Habitat Suitability Index Models: Mink. U.S. Fish and Wildlife Service Biological Report 82 (10.127). 23pp.

Ashley, Paul R. and Matt T. Berger. 1999. Unpublished Habitat Suitability Index Models: Mule Deer (Winter). Developed for Columbia River Mitigation HEP Studies in cooperation with BPA. Joint effort between Washington Department of Wildlife and Confederated tribes of the Colville Reservation. 34pp.

Bodurtha, Tim. 1991. Unpublished Habitat Suitability Index Model: Bobcat. U.S. Fish and Wildlife Service. 11pp.

Clausnitzer, R. and B. Zamora. 1987. Forest Habitat Types of the Colville Indian Reservation. Department of Forestry and Range Management, Washington State University, Pullman, Washington. 110pp.

Hays, R. L., C Summers, and W. Seitz. 1981. Estimating wildlife habitat variables. U.S.D.I. Fish and Wildlife Service. FWS/OBS-81/47. 111pp.

Schroeder, Michael A. and Paul R. Ashley 1996. Unpublished Habitat Suitability Index Model: Sharp-tailed Grouse. Developed for Columbia River Mitigation HEP Studies in cooperation with BPA. Washington Department of Wildlife. 12pp.

Schroeder, R.L. 1982. Habitat suitability index models: Downy Woodpecker. U.S. Dept. Int., Fish and Wildl. Serv. FWSOBS-82/10.38. 10pp.

U. S. DOE. Bonneville Power Administration. 1992. Wildlife Habitat Impact Assessment Chief Joseph Dam Project, Washington. Project Report, January 1992. . Joint effort between Washington Department of Wildlife and Confederated Tribes of the Colville Reservation. 122pp.